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Shear bond strength of APC Plus adhesive coated appliance system to enamel in wet and dry conditions: An in vitro study

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Abstract

Objective: It is claimed that a hydrophilic primer, called the moisture insensitive primer (MIP), can be used with both dry and wet enamel surfaces. This study sought to assess the shear bond strength (SBS) of APC Plus adhesive coated appliance system to enamel using MIP in wet and dry conditions.

Materials and methods: This in vitro experimental study evaluated 24 extracted maxillary premolars with intact buccal enamel. The teeth were randomly divided into two groups (n=12), and APC Plus premolar brackets were bonded to their buccal surface using moisture insensitive primer (MIP) under wet and dry enamel conditions. The SBS values were measured by a universal testing machine. The adhesive remnant index (ARI) score was also determined under a stereomicroscope. Data were analyzed using t-test and Mann-Whitney test at $P<0.05$ level of significance.

Results: The SBS in wet condition was significantly lower than that in dry condition (mean value of 18.37MPa versus 25.5MPa, $P<0.001$). The two groups had no significant difference regarding the ARI scores ($P>0.05$). However, in both groups, less adhesive was left on the tooth surface. This suggests that bond failure occurred at the adhesive-enamel interface.

Conclusions: APC Plus adhesive coated appliance system in combination with hydrophilic MIP can be effective in clinical conditions with high risk of moisture contamination.

Keywords: APC Plus; Dental Enamel bonding; Dry; Moisture-insensitive primer; Orthodontic Brackets; Shear Strength; Wet conditions.